



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/550,256	09/22/2005	Donald Edwin Hargraves	2974/2US	1625
23638 7590 11/06/2009 ADAMS INTELLECTUAL PROPERTY LAW Suite 2350 Charlotte Plaza 201 South College Street CHARLOTTE, NC 28244				
EXAMINER				
KIM, JOHN K				
ART UNIT		PAPER NUMBER		
2834				
MAIL DATE		DELIVERY MODE		
11/06/2009		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/550,256

Applicant(s)

HARGRAVES ET AL.

Examiner

JOHN K. KIM

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 August 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21-26 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 September 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/5508)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Inventor's Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

1. This Office action is in response to papers filed on 8/17/2009. Amendments made to the claims and Applicant's remarks have been entered and considered.

Remarks

2. In view of amendments, the Examiner withdraws the rejection under 35 USC 102(b) and the rejection under 35 USC 103(a) to claims 1, 3-5, 7, 13-17, 19-20. However, claims 21-26 are not in a condition for allowance in view of new ground of rejection. The applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

3. In response to applicant's CFR 1.132 Declaration, items 1-8, 10-12 are understood explaining how the applicant came up with the invention; for item 9, commercial success must be supported by evidence showing it being only derived from claimed invention. See MPEP 706.03 and 706. 02(d); items 13-15 have been considered but are moot in view of the new ground(s) of rejection.

4. In general, each pump has own characteristics and advantages, and the advantage of diaphragm reciprocating pump is known as high suction power, which can be found at http://en.wikipedia.org/wiki/Diaphragm_pump. In addition to that, rotating power from an electrical rotary motor can be used for reciprocating action. See home refrigerator. Rotary motor drives reciprocating compressor (which can also be termed as pump). Thus, use of rotating motor to reciprocating pump is notoriously old and well known knowledge in the art.

5. The claims 1-20 have been cancelled, and claims 21-26 have been newly added. In view of amendment, the examiner reviewed amended claims and remarks as follows.

Drawings

6. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Claims 21-26 refers a pump which is a reciprocating pump, such that the shaft of the motor operatively connected to the pump for converting non-reciprocating motion of the shaft to reciprocating pumping motion (claim 21). However, reciprocating pump connected to motor shaft is not shown. Under current disclosure, conversion from rotary action to reciprocating action is not able to figure out.

These items must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either

"Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 21 and 26 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The claim 21 recites

(d) ... the shaft has a predetermined amount of axial and radial play relative to the housing;

(e) ... wherein the first inner race and the second inner race are locked into respective fixed positions to the shaft and the first outer race and the second outer race are locked into respective fixed positions to the housing to prevent axial and radial movement of each of the first inner race and the second inner race relative to the shaft and the first outer race and the second outer race relative to the housing, such that the shaft is

locked in the preloaded position to prevent reciprocating axial and radial movement during motor operation;

Above two limitations are conflicting. In section (d), the shaft has some amount of axial and radial play, i.e., it is allowed to move. In section (e), the shaft is not allowed to move. It is not sufficiently described how the confliction has been resolved. For purpose of examination, the examiner regards axial and radial play mentioned in section (d) is inherent tolerance/clearance in every motor assembly. Note that every motor has some amount of tolerance/clearance in assembly of parts. Only differences are the predetermined amount which the applicant has not been defined.

Claim 26 recites "... shaft are selected so that the rotor assembly will be retained in the preloaded position over a temperature range of about -400 C to about 1050 C" is not described sufficiently for those ordinary skilled in the art and it has not been disclosed in original specification.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
11. Claims 21, 22 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (US 4353002) in view of Schlick (US 4482301) and further view of Paillet et al (US 4471246).

As for claim 21, Kobayashi shows (in Figs. 1-3) and discloses non-reciprocating electric motor and a reciprocating pump operatively connected to the motor for being driven by the motor, comprising:

- (a) a housing assembly (2, 6, 7) having first and second ends;
- (b) a metal first bearing (8) mounted in the housing, the first bearing having a plurality of rolling elements positioned between first inner and outer races ;
- (c) a metal second bearing (9) mounted in the housing and spaced away from the first bearing, the second bearing having a plurality of rolling elements positioned between second inner and outer races;
- (d) a metal rotor assembly (4) including a metal shaft (5) having first and second ends mounted in the first and second bearings, respectively, such that the shaft has a predetermined amount of axial and radial play relative to the housing (inherent tolerance/clearance of parts assembly);

(f) a pump (col. 4, line 57-63; col. 1, line 37-41), the shaft of the motor operatively connected to the pump for converting non-reciprocating motion of the shaft to pumping motion; and

(g) the housing assembly, rolling elements, races, bearings, and shaft of the motor having respective coefficients of thermal expansion selected (see claim 6) so that (intended use that the structure of Kobayashi also can do) the rolling elements, races, bearings, and shaft contract and expand during varying thermal conditions while remaining in their respective locked, preloaded position during motor operation due to the selected coefficients of thermal expansion.

Kobayashi further shows (in Figs. 1-3) a part attached to bearings, wherein the first inner race and the second inner race are locked into respective fixed positions to the shaft (5) and the first outer race and the second outer race are locked into respective fixed positions to the housing (2, 6, 7) to prevent (intended use that the structure of Kobayashi also can do) axial and radial movement of each of the first inner race and the second inner race relative to the shaft and the first outer race and the second outer race relative to the housing, such that the shaft (5) is locked in the preloaded position (as journaled by bearing) to prevent (intended use that the structure of Kobayashi also can do) reciprocating axial and radial movement during motor operation,

but silent to disclose expressly (1) the pump being a reciprocating pump; and (2) a metal biasing element positioned between one of the shaft or the housing and one of

the bearings, the biasing element for initially urging the shaft to a preloaded position relative to the housing; and the housing assembly being made of a metal.

Re (1), Schlick shows (in Figs. 1-6) and discloses such a motor with ball bearings on both sides well suits for reciprocating diaphragm pump. Therefore it would have been obvious to use the electric motor for diaphragm reciprocating pump instead of circular pump by combining the teaching of Schlick with that of Kobayashi for predictable result of good suction characteristics which is well known advantage of diaphragm reciprocating pump. Also, as remarked above, it is well known application.

Re (2), Paillet shows (in Fig. 1) and discloses a metal biasing element (94 or 95) positioned between one of the shaft (9) or the housing and one of the bearings (81), the biasing element for initially urging the shaft to a preloaded position relative to the housing. Paillet also discloses (col. 2, line 13-16) the housing assembly being made of a metal, and also it is notoriously old that housing made of metal for motor or pump. Therefore it would have been obvious to have a metal biasing element and housing, since the spring/washer or housing made of metal is notoriously old and well known and the part attached to bearings shown by Kobayashi is appreciated by those skilled in the art to be washer or spring, by combining the teaching of Paillet with that of Kobayashi for predictable result of maintaining the rotor inside the stator (col. 3, line 26-30) and reliable structure against impact, which is well known in the art and also same reason to the applicant.

As for claim 22, Kobayashi in view of Schlick and Paillet shows and discloses the claimed invention as applied to claim 21 above. Kobayashi in view of Paillet shows and

discloses the biasing element comprises a spring positioned between the rotor assembly and the first or second inner race since Paillet shows at least element 94 being a spring and, in well known, washer can have spring function.

As for claim 26, Kobayashi in view of Schlick and Paillet shows and discloses the claimed invention as applied to claim 21 above. Kobayashi in view of Paillet further shows (in Fig. 1) and discloses inherently the coefficients of thermal expansion of the housing assembly, the balls, races, bearings, and the shaft are selected so that the rotor assembly will be retained in the preloaded position over a temperature range of about -400 C to about 1050 C, since stainless steel used for the balls, races, bearings, and the shaft has melting temperature 2781 F (or 1527 C, answered from [http://wiki.answers.com/Q/What is the melting point of Stainless Steel](http://wiki.answers.com/Q/What_is_the_melting_point_of_Stainless_Steel)) and, carbon steel, a most common magnetic steel as used for housing 7 in Paillet, has melting temperature 1540 C (answered from http://www.engineeringtoolbox.com/melting-temperature-metals-d_860.html)

12. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (US 4353002) in view of Schlick (US 4482301) and Paillet et al (US 4471246), and in further view of Brown (US 6612015).

As for claim 23, Kobayashi in view of Schlick and Paillet shows and discloses the claimed invention as applied to claim 21 above. References however are silent to show or disclose the biasing element comprises a spring positioned between the housing and the first or second outer race. In the same field of endeavor, Brown shows (in Fig. 1) and discloses a biasing element (32) comprises a spring positioned between the

housing (34) and the first or second outer race (26, since the spring contacts at outer part of bearing which is appreciated the outer race), and therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to combine the teaching of Brown with that of Kobayashi in view of Paillet for predictable results of small displacement of shaft due to thermal expansion (col. 4, line 41-49), and such the relocation of the spring has been held that rearranging parts of an invention involved only routine skill in the art. *In re Japikse*, 86 USPQ 70 (CCPA 1950)

13. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (US 4353002) in view of Schlick (US 4482301) and Paillet et al (US 4471246), and in further view of Brown (US 2001/0030476).

As for claim 24, Kobayashi in view of Schlick and Paillet shows and discloses the claimed invention as applied to claim 21 above. Kobayashi further shows (in Fig. 1) and discloses (col. 2, line 51) the housing assembly comprises: a generally cylindrical housing (2) including an axially extending portion with a front end plate (see part 7) connected to a front end thereof; except an end bell attached to a rear end of the housing. In the same field of endeavor, Brown shows (in Fig. 1) an end bell attached to a rear end of the housing. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to change the shape of rear end of the housing to a shape of Brown by combining the teaching of Brown with that of Kobayashi in view of Paillet for predictable results of reducing a weight by removing section of rear housing, and such change in shape is generally recognized as being

within the level of ordinary skill in the art. *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

14. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kobayashi et al (US 4353002) in view of Schlick (US 4482301) and Paillet et al (US 4471246), and in further view of Nishimura (US 6495941).

As for claim 25, Kobayashi in view of Schlick and Paillet shows and discloses the claimed invention as applied to claim 21 above. Kobayashi further shows (in Fig. 1) and discloses (col. 3, line 21-35) the bearings are constructed from high carbon chromium steel and the housing assembly, except the rotor assembly are constructed from 400 series stainless steel. In the same field of endeavor, Nishimura shows (in Fig. 7) and discloses (in second embodiment, col. 7, line 36-39) rotor assembly constructed from stainless steel and, since series 400 is one of the stainless steel, it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice, for predictable result of enhanced strength of the rotor. (see col. 7, line 52-54, and *In re Leshin*, 125 USPQ 416).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOHN K. KIM whose telephone number is (571)270-5072. The fax phone number for the examiner where this application or proceeding is assigned is 571-270-6072. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Quyen Leung can be reached on 571-272-8188. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

Art Unit: 2834

USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Quyen Leung/
Supervisory Patent Examiner, Art Unit 2834

JK